

Philippine Journal of Chest Diseases
Volume 8, Number 1
Featured Articles:

**DEVELOPMENT OF AN EVIDENCE-BASED ALGORITHM
ON WEANING PATIENTS FROM MECHANICAL VENTILATION:
The Philippine General Hospital Setting**

Jubert P. Benedicto, MD, Ester Jean R. Rosaros, MD., Evelyn Reside, MD,
Iris Thiele C. Isip, MD

**THE USE OF RAPID SHALLOW BREATHING INDEX (RSBI), MAXIMUM
INSPIRATORY PRESSURE (MIP), AND THE CLINICAL PARAMETERS
SCORING SYSTEM (CPS) AS PREDICTORS FOR EXTUBATION AMONG
MECHANICALLY VENTILATED PATIENTS**

Glenn A. Pono, M.D., Leila M. Dumagsa, M.D., Abundio A. Balgos, M.D., FPCP,
FPCCP

**SERIAL MEASUREMENT OF RAPID SHALLOW BREATHING INDEX
DURING SPONTANEOUS BREATHING TRIALS AMONG PATIENT BEING
WEANED FROM MECHANICAL VENTILATORY SUPPORT**

Ray P. Suanding, M.D., Tomas M. Realiza, M.D., FPCP, FPCCP

**A SURVEILLANCE ON THE WEANING PRACTICES OF MEDICAL
RESIDENTS AT A TERTIARY GOVERNMENT HOSPITAL**

Jubert Benedicto, M.D., Ester Jean Rosaros, M.D., Joel Santiaguel, M.D.,
Julius Gene Latorre, M.D.

**EFFECT ON THE DURATION OF MECHANICAL VENTILATION ON
IDENTIFYING PATIENTS CAPABLE OF BREATHING SPONTANEOUSLY**

Egres A. Gopio, M.D., Tomas M. Realiza, M.D.

**CLINICAL USEFULNESS OF CAPILLARY BLOOD GAS
IN PREDICTING ARTERIAL BLOOD GAS**

Reena Segundina Katigbak-Pompa, M.D., Loreto J. Codamos, M.D.,
Tomas M. Realiza, M.D., FPCP, FPCCP

**EPIDEMIOLOGIC STUDY ON COMMUNITY-ACQUIRED PNEUMONIA
CLASS III AND IV AT ST. LUKE'S MEDICAL CENTER FROM 1997-1998**

Geraldine C. Garcia, M.D

**DEVELOPMENT OF AN EVIDENCE-BASED ALGORITHM
ON WEANING PATIENTS FROM MECHANICAL VENTILATION:
The Philippine General Hospital Setting**

By: Jubert P. Benedicto, MD. Ester Jean R. Rosaros, MD., Evelyn Reside, MD,
Iris Thiele C. Isip, MD

There are no definite criteria of weaning patients from the ventilator. In many instances, the procedure to be used of weaning depends on the physicians experience with previous other methods. In order to examine this further, a literature search was made covering publications from 1970-1998. In addition, queries were also made from each local pulmonary training institution for any unpublished data. Articles were then rated according to their reliability based on an accepted scoring system. Based on this, we conclude the following:

(1) Although theoretically rational, data from prospective studies dealing with the certain utility of physiologic and clinical parameter in connection with weaning is not currently sufficient. However the differences in values noted between success and failure deserve due attention.

(2) Among the conventional weaning parameters, the tidal volume has the most attractive feature in terms of accuracy, feasibility, and reproducibility.

(3) The rapid shallow breathing index using a cut-off value ≤ 100 , may be used as a tool to accurately predict a successful weaning outcome.

(4) A 2-hour trial of spontaneous breathing thru a T-tube prior to extubation maybe recommended. If a patient fails this, then gradual weaning may be attempted using either T-piece or pressure support ventilation. Phil. Journal Chest Diseases. Vol. 8 No. 1 pp: 1-17.

THE USE OF RAPID SHALLOW BREATHING INDEX (RSBI), MAXIMUM INSPIRATORY PRESSURE (MIP), AND THE CLINICAL PARAMETERS SCORING SYSTEM (CPS) AS PREDICTORS FOR EXTUBATION AMONG MECHANICALLY VENTILATED PATIENTS

By: Glenn A. Pono, M.D., Leila M. Dumagsa, M.D.,
Abundio A. Balgos, M.D., FPCP, FPCCP

OBJECTIVE: This study aimed to compare the accuracy of RSBI, MIP, and CPS in predicting successful extubation among mechanically ventilated patients.

RESEARCH DESIGN: Prospective Cohort Study

METHODS: All patients on mechanical ventilation (MV) for more than 72 hr. from July to September 1999 were randomly assigned to one of the three (3) study protocols. The threshold values for RSBI, MIP and CPS were set at ≤ 105 , ≤ -30 cm H₂O, and 8 points, respectively. The main outcome of the study was to determine those patients who were weaned then successfully extubated, and those who failed.

RESULTS: Sixty-four patients were randomized and analyzed in this study. Thirty-five patients (54.7%) were successfully extubated. Twenty-nine patients (45.3%) comprised the failure group. Eight patients (12.5%) died during the study period, which was attributed to their primary medical illnesses; tracheostomy was necessary in 12 patients (18.7%); four patients were reintubated (6.3%); MV was reinstated in four patients (6.3%); and one patient (1.6%) needed extended T-piece support. There was no significant difference in the age, sex, height, and weight of the success and failure groups ($p > 0.05$); however, there was a significant difference in the mean number of MV days (8.4 vs. 14.38 days, $p > 0.0319$), mean RSBI (68.64 vs. 95.02, $p < 0.025$), mean MIP (-30.89 vs. -23.57 cm H₂O, $p < 0.013$). There was no significant difference in the mean CPS values (7.657 vs. 7.667, $p < 0.943$).

RSBI had a sensitivity of 86%, specificity of 31%, and overall diagnostic accuracy of 61%, while MIP had a sensitivity of 63%, specificity of 83%, and overall accuracy of 72%. CPS had a sensitivity of 66%, specificity of 45%, and overall accuracy of 56%. When two or three parameters were used in combination in predicting extubation, RSBI-CPS has the highest sensitivity (57%), while RSBI-MIP-CPS had the highest specificity (97%). The combination of MIP-CPS had the highest overall accuracy of 72%.

The likelihood ratios of RSBI, MIP, and CPS in predicting extubation were 1.2429, 3.6457, and 1.1911, respectively. However, when used in combination, the RSBI-MIP-CPS likelihood ratio was 13.2571, MIP-CPS (7.8714), RSBI-MIP (3.9357), and RSBI-CPS (1.6571).

CONCLUSION: RSBI was the most sensitive index, while MIP was the most specific index when used alone in predicting successful extubation. Using more than one index in this study, RSBI-CPS had the highest sensitivity, while RSBI-MIP-CPS, combination had the highest specificity and likelihood ratio. *Phil. Journal Chest Diseases*. Vol. 8 No. 1 pp 18-23.

SERIAL MEASUREMENT OF RAPID SHALLOW BREATHING INDEX DURING SPONTANEOUS BREATHING TRIALS AMONG PATIENT BEING WEANED FROM MECHANICAL VENTILATORY SUPPORT

By: Ray P. Suanding, M.D., Tomas M. Realiza, M.D., FPCP, FPCCP

BACKGROUND: Several parameters are used for predicting weaning outcome. Some lack sensitivity and specificity. More newer parameters with superior predictive values require the use of specialized equipments and invasive procedures. Using the rapid shallow breathing index (f/Vt) pioneered by Yang and Tobin, a value ≤ 105 is an accurate predictor of weaning success. Among elderly patients, an f/Vt < 130 seems to be a more appropriate value.

METHODS: We carried out a prospective observational, non-interventional study involving 31 patients on mechanical ventilatory support who were deemed capable of being weaned and extubated by their primary physicians. Spontaneous respiratory rate (f, breaths per minute) and tidal volume (Vt, L) were measured using the Wright's Spirometer while the patients breathed through a T-piece set-up for 60 seconds. Tidal volume was then determined by dividing the respiratory rate with the minute ventilation measured by the respirometer and calculating f/Vt. The f/Vt measurements were repeated using the same hand-held respirometer at hourly intervals until the second hour. So as not to influence their decision, the parameters but none of the subsequent measurements.

RESULTS: The initial f/VT was significantly different from values taken after 1 hour and 2 hours of T-piece set-up ($p = 0.000$ and $p = 0.000$, respectively). Twenty-four (77%) patients had a rapid shallow breathing index (RSBI) > 105 , nineteen of who were successfully extubated and five failed. The number of patients with f/Vt > 105 who were successfully extubated were significantly greater than those who failed extubation ($p = 0.000796$). There was also a significant difference in the RSBI between patients < 60 and those ≥ 60 years old initially, after 1 hour 2 hours of T-piece set-up ($p = 0.000$, $p = 0.001$ and $p = 0.000$, respectively).

CONCLUSION: Rapid shallow breathing index measured serially during spontaneous breathing trials tend to increase overtime and it appears that an f/Vt > 105 is not a contraindication to weaning trials and eventual extubation, particularly in patients aged 60 years old and above. *Phil. Journal Chest Diseases*. Vol. 8 No. 1 pp: 24-27.

A SURVEILLANCE ON THE WEANING PRACTICES OF MEDICAL RESIDENTS AT A TERTIARY GOVERNMENT HOSPITAL

By: Jubert Benedicto, M.D., Ester Jean Rosaros, M.D., Joel Santiaguel, M.D.,
Julius Gene Latorre, M.D.

Weaning is an important part of providing ventilatory support to patients. Much as patients are placed on mechanical ventilation, procedures should also be present to facilitate their removal from the same. However, up to the present time, no clear-cut steps are enumerated to make this an easier process. In order to address this problem, this study was undertaken to find out how residents in a tertiary government hospital weaned patients from mechanical ventilation. All adult intubated charity patients during a fourteen-week period (April – July 1998) were considered were noted. All patients were followed up until 14 days after intubation. Outcomes during this period attempt not requiring re-intubation within 48 hours. On the other hand, failure was defined as inability to tolerate a weaning attempt or those who initially were extubated but required re-intubation within 48 hours.

In general, most junior medical residents at the UP-PGH Medical Center are deficient in terms of monitoring mechanically ventilated patients and in determining the initial set-up of these machines. They are however knowledgeable in the timing of initiating a weaning attempt and in deciding when to extubate a patient. Most still use the incremental method of T-piece weaning. Respiratory failure was still the number one cause for intubation. *Phil. Journal Chest Diseases*. Vol. 8. No. 1 pp: 28-33.

EFFECT ON THE DURATION OF MECHANICAL VENTILATION ON IDENTIFYING PATIENTS CAPABLE OF BREATHING SPONTANEOUSLY

By: Egres A. Gopio, M.D., Tomas M. Realiza, M.D.

Mechanical ventilation is used primarily to support patients whose respiratory function is so compromised by disease or other conditions that they cannot adequately breathe with out assistance. As is the case with other medical therapies, however, the benefit comes at a price. Therefore, mechanical ventilation should be discontinued as quickly as possible in patients who both required this therapy and desire it. It was hypothesized in this study that screening patients daily to identify those who can breathe spontaneously and notifying physicians promptly when a patient completes a trial of spontaneous breathing successfully could promote the earlier discontinuation of mechanical ventilation. We found out from this study that identifying patients who can be weaned after completion of trials of spontaneous breathing, shortened the duration of mechanical ventilation by as much as two and a half days (60 hours) as compared with its duration in patients who had more gradual weaning with standard care (control group). In our study, weaning time did not show any statistical significance probably due to the much smaller study population. Our observations also underscore the key role of non-physician health professionals in providing safe, efficient ventilatory care. During the study, the commitment of time by physicians appeared minimal, since more monitoring was done by respiratory therapists and nurses as part of their standard care. We recommend continuing this study for a longer period of time and increasing further the population which could help in making the analysis of the study more significant. *Phil. Journal Chest Diseases*. Vol. 8 No. 1 pp: 34.37.

CLINICAL USEFULNESS OF CAPILLARY BLOOD GAS IN PREDICTING ARTERIAL BLOOD GAS

By: Reena Segundina Katigbak-Pompa, M.D., Loreto J. Codamos, M.D.,
Tomas M. Realiza, M.D., FPCP, FPCCP

The Arterial Blood Gas (ABG) analysis is very useful in the screening of pulmonary function of patterns with respiratory illness and those who are critically ill. However, collecting arterial blood is an invasive, sometimes, traumatic procedure. On the other hand, capillary blood gas (CBG) levels are more easily obtained by finger puncture may in fact be a more accurate reflection of true oxygenation and acid-base status at the tissue level, considering its location at the distal end of the systemic arterial system. This study therefore is designed to assess the clinical usefulness of capillary blood gas levels in predicting ABG levels. It claims to determine whether CBG can be used as a substitute for ABG. Paired determinations of ABG and CBG were done in 96 patients. Through regression analysis, a formula was obtained predicting ABG from CBG values. This formula was validated using another set of 27 patients and finding out if their obtained ABG correlated with the ABG values as predicted from CBG results. This study indicates that indeed CBG can be used as a substitute for ABG and that there is a high positive correlation which exists between the two. *Phil. Journal Chest Diseases*. Vol. 8 No. 1 pp: 38-40.

EPIDEMIOLOGIC STUDY ON COMMUNITY-ACQUIRED PNEUMONIA CLASS III AND IV AT ST. LUKE'S MEDICAL CENTER FROM 1997-1998

By: Geraldine C. Garcia, M.D.

Community-acquired pneumonia remains a common and serious illness despite the availability of potent new antimicrobials and effective vaccines. Our objectives for this report are to describe the clinical profile of patients classified under Community-acquired pneumonia Class III and IV; to review the diagnostic modalities used in community-acquired pneumonia; and to review the treatment protocol adapted by both pulmonologist and non-pulmonologist in managing community-acquired pneumonia. Records of patients who were confined at St. Luke's Medical Center due to community-acquired pneumonia from January 1997 to December 1998 were reviewed. A total of 49 subjects were included in the study. Most patients had more than one co-existing morbidity. The most commonly occurring co-morbidity in patients with community-acquired pneumonia is the presence of hypertension and cardiac illness (55%) followed by smoking (36%), diabetes (32%), tuberculosis (24%), COPD, (18%) and asthma (12%). The most common presenting sign or symptom is cough with productive sputum production (97%) followed by fever (67%), leukocytosis (65%) and abnormal breath sounds (67%). The most common radiologic manifestation noted in the cases reviewed was the presence of bilateral infiltrates (32%) followed by unilateral infiltrates mostly at the right. This review revealed that only 35% of the cases have identified the offending organisms. Among the cases of community-acquired pneumonia Class III, still the most utilized therapy is the combination of a 2nd generation cephalosporin and macrolide (39%) followed by 2nd generation cephalosporine alone (29%) and some utilized fluoroquinolones as their initial antibiotic of choice (14%). Among the cases of community-acquired pneumonia Class IV, ceftriaxone was used as initial treatment (25%) and other antibiotics utilized were 3rd generation and 4th generation cephalosporins as well as the fluoroquinolones. The usual choice of antibiotics on non-pulmonary specialists did not differ much when compared to the pulmonary specialists. *Phil. Journal Chest Diseases*. Vol. 8 No. 1 pp: 41-46.